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Laser Inertial Fusion Energy Control Systems*

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A Laser Inertial Fusion Energy (LIFE) facility point design is being developed at LLNL to support an Inertial Confinement Fusion (ICF) based energy concept. This will build upon the technical foundation of the National Ignition Facility (NIF), the world's largest and most energetic laser system. NIF is designed to compress fusion targets to conditions required for thermonuclear burn. The LIFE control systems will have an architecture partitioned by sub-systems and distributed among over 1000's of front-end processors, embedded controllers and supervisory servers. LIFE's automated control subsystems will require interoperation between different languages and target architectures. Much of the control system will be embedded into the subsystem with well defined interface and performance requirements to the supervisory control layer. An automation framework will be used to orchestrate and automate start-up and shut-down as well as steady state operation. The LIFE control system will be a high parallel segmented architecture. For example, the laser system consists of 384 identical laser beamlines in a "box". The control system will mirror this architectural replication for each beamline with straightforward high-level interface for control and status monitoring. Key technical challenges will be discussed such as the injected target tracking and laser pointing feedback. This talk discusses the the plan for controls and information systems to support LIFE.

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